

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

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UNITED STATES OF AMERICA,

Plaintiff,

- against -

Civil Action

No. CV- 07-0835

AGI-VR/WESSON COMPANY;
ALLOY CARBIDE COMPANY;
CHI MEI CORPORATION;
CLIMAX MOLYBDENUM COMPANY;
CLIMAX MOLYBDENUM MARKETING
CORPORATION;
COUNTY OF NASSAU, NEW YORK;
CYPRUS AMAX MINERALS COMPANY;
GENERAL ELECTRIC COMPANY;
GTE CORPORATION;
H.C. STARCK, INC.;
KENNAMETAL INC.;
M & R INDUSTRIES, INC.;
MINMETALS INC.;
OSRAM SYLVANIA CORPORATION;
PHILIPS ELECTRONICS NORTH
AMERICA CORPORATION;
SANDVIK AB;
TDY HOLDINGS, LLC; and
TDY INDUSTRIES, INC.,

(Seybert, J.)
(Orenstein, Ch. M. J.)

Defendants.

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APPENDIX D PART 5 TO THE CONSENT JUDGMENT

*Health and Safety Contingency Plan
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- Immediately stop site operations in the event of an emergency or serious hazard in order to protect personnel and the environment;
- Prepare and submit required work progress and accident history reports and air monitoring reports;
- Maintain all required health and safety records (OSHA 300 Logs, Accident Reports, Records of Training, Safety Inspection Reports, etc.);
- Prepare training materials for safety meetings to address the safe work practices and procedures necessary to maintain a safe and healthy working environment; and
- Respond to accidents with prompt corrections to eliminate recurrences.

2.2.2 Health and Safety Officer

The HSO, Mr. Ted Johnson, will implement the HSCP and will be responsible for the following tasks:

- Oversee and enforce the HSCP;
- Ensure that on-site training occurs and that the HSCP is implemented on site;
- Oversee site activities on a full-time basis for the entire duration of field activities;
- Ensure site activities are conducted in accordance with specific health and safety requirements, federal and OSHA regulations, and all aspects of the HSCP, including, but not limited to, activity hazard analysis (AHA), air monitoring, use of PPE, decontamination, site control, standard operating procedures (SOPs) used to minimize hazards, safe use of engineering controls, the emergency response plan, and preparation of records by performing a daily health and safety inspection, and documenting the results;
- Serve as a member of the quality control staff on matters relating to health and safety; and
- Halt work in consultation with the PM if unacceptable health and safety conditions exist and take necessary action to re-establish and maintain safe working conditions.
- Check employees at the start of each work shift to be sure each is fit to perform the assigned tasks;
- Continually evaluate all supervised employees for safety knowledge, physical limitations, and current job knowledge;
- Ensure that each individual understands and follows the precautions to be taken to mitigate potential hazards; [This task seems more appropriate for an on-site person, either the CS or the HSO.]

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- Give specific safety instructions as part of the job instructions for each work assignment, based on first-hand knowledge of the tasks and the task environment; and
- Discuss the potential hazards of a given operation with appropriate personnel;

2.2.3 Project Health Physicist

Mr. Ted Johnson also will serve as the PHP. The PHP will be responsible for the following tasks:

- Development and implementation of all radiation safety activities;
- Implement the project radiation monitoring program;
- Consult with site personnel on radiological issues;
- Oversee all operations relating to radioactive waste sampling and characterization; and
- Develop the supporting data for meeting the respective disposal facility waste acceptance criteria.

2.2.4 Health Physics Technician

The HPTs will be responsible for the following tasks:

- Perform radiation safety monitoring using portable radiation detection equipment;
- Maintain and operate all hand-held portable equipment in accordance with ECC SOPs;
- Implement daily assignments generated by the HSO;
- Immediately report any unsafe conditions to the HSO pertaining to radiation safety; and
- Support the development of decontamination and waste segregation methods.

2.2.5 Field Personnel

All field personnel assigned to the project, including subcontractor personnel, will follow the requirements of the HSCP and will be responsible for the following:

- Act in a responsible and cautious manner to prevent accident, injury, and/or exposure to themselves and their co-workers;
- Report any and all accidents, injuries, exposures, and/or near misses to the HSO and/or the PM;

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- Attend and participate in Tailgate Safety Meetings prior to commencing daily work, and receive a pre-job safety briefing from the PM if the Tailgate safety meeting was missed;
- Follow the instructions and directions of the HSO, the PHP, and the PM;
- Utilizing the PPE provided and for the specified use;
- Following all field safety procedures for safe work practices, buddy system, communication, site control, decontamination, evacuations, and related emergency procedures;
- Perform only those tasks they have been instructed to perform and that they are trained, qualified, and capable of performing at the time of assignment;
- Report to the PM or HSO any personal condition that could affect their safety and/or the safety of co-workers (e.g., fatigue, drowsiness, severe illness, impairment by prescription medications, influence by drugs and alcohol, emotional distress, or other conditions); and
- Ensure that no work tasks are performed in deviation from the HSCP and/or the initial instructions of the PM or HSO without the expressed authorization and additional instruction of the PM and/or HSO.

2.3 Site Visitors

ECC personnel, authorized subcontractors, client representatives, appropriate regulators, and authorized visitors will be the only people allowed into the work areas. Any authorized visitor who seeks entry into an Exclusion Zone (EZ) will present documentation of health and safety training in compliance with OSHA 29 CFR 1910.120, medical surveillance examination and certification and respirator fit testing (if necessary).

All visitors will be required to check in with the ECC PM and sign the Visitor Information Form (Attachment A). All visitors also will receive a briefing on the HSCP before entering the site. Visitors will be escorted by ECC personnel and will adhere to all established safety and health requirements, including training and the wearing of PPE.

In addition, any authorized visitor who seeks entry into an area where the potential for exposure is greater than 100 mrem per year will present document of training in compliance with 10 CFR 19, medical surveillance, and respirator fit testing dependant upon the area requested to enter. A trained and badged project employee will escort all visitors. The RSO may grant a visitor access to a controlled area without training on a case-by-case basis provided the visitor does not enter a contamination, or airborne radioactivity area.

The RSO will evaluate the area into which the visitor is entering and determine if the visitor is likely to receive an annual external whole body dose equivalent of 50 mrem or more in a year. If such is the case, the escort's proportional external exposure for the duration of the visit will be assigned to the visitor.

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3.0 SITE CONTAMINATION CHARACTERIZATION

The primary Contaminants of Concern (COCs) at the Li-Tungsten Site are Radium 226 (Ra-226), Thorium 232 (Th-232), Arsenic (As), and Lead (Pb). Table 3-1 presents the exposure limits and health effects for the COCs.

Table 3-1
Site Contaminant Exposure Limits and Characteristics

Chemical	Inhalation ALI (μCi)	Inhalation DAC ($\mu\text{Ci/mL}$)	Effluent Concentration Air ($\mu\text{Ci/mL}$)
Radium 226	6×10^{-1}	3×10^{-10}	9×10^{-13}
Thorium 232	1×10^{-3}	56×10^{-13}	--

Chemical	PEL/TLV	IDLH (mg/m^3)	Soil Concentrations (mg/kg)	Route of Entry	Target Organs	Symptoms
Arsenic	OSHA PEL ACGIH TLV 0.01 mg/m^3	Ca 5	3.02 – 248	Inhalation, Absorption, and Ingestion	Liver, kidneys, skin, lungs, lymphatic system	Ulceration of nasal septum, dermatitis, GI disturbances, and respiratory irritation
Lead	OSHA PEL ACGIH TLV 0.05 mg/m^3	100		Inhalation and Ingestion	Eyes, GI tract, central nervous system, kidneys, and blood	Weakness, facial pallor, abdominal pain, anemia, gingival lead line, and kidney disease.

ACGIH – American Conference Governmental Industrial Hygienist

ALI – Annual Limit Intake

Ca – Possible Occupational Carcinogen

DAC – Derived Air Concentration

IDLH – Defined as conditions that pose an immediate threat to life or health or conditions that pose an immediate threat or severe exposure to contaminants which are likely to have an adverse cumulative or delayed effect on health. If the contaminant concentration is above the IDLH levels, only a pressure-demand self contained breathing apparatus (SCBA) is allowed.

μCi – microcuries

$\mu\text{Ci/mL}$ – microcuries per milliliter

mg/kg – milligram per kilogram

mg/m^3 – milligrams per cubic meter

PEL – Established by federal or state OSHA. PELs may be expressed as an 8-hour Time Weighted Average (TWA) or as a ceiling limit. PELs are enforceable by law.

TLV – Developed by American Conference of Governmental Industrial Hygienist (ACGIH). TLVs are developed as guidelines to assist in the control of health hazards. These recommendations or guidelines are intended for use in the practice of industrial hygiene. They are not developed for use as legal standards.

4.0 HAZARD/RISK ANALYSIS

The HSCP includes a health and safety hazard/risk analysis for each site task and operation to be performed. The hazard/risk analysis provides information necessary for determining health and safety procedures, equipment, and training to protect on-site personnel, the environment, and the public. The analysis defines the activities to be performed and identify the sequence of work, the specific hazards anticipated, and control measures to be implemented in order to reduce each hazard to an acceptable level. The AHA will be continuously reviewed and when appropriate, modified to address changing site conditions or operations with the concurrence of the PM and HSO.

4.1 Site Tasks and Operations

Based on the type of remediation required, the following is a list of the anticipated major site tasks:

- Mobilization;
- Construction of contamination control and drainage elements;
- Establishment of work zones;
- Soil excavation, removal, and disposal;
- Sampling and analysis;
- Placement of backfill soil, compost, and seeding; and
- Demobilization.

4.2 Hazards

The following potential hazards may be encountered during fieldwork.

4.2.1 Physical Hazards

The physical hazards that may be encountered during site work include the following.

4.2.2 Flammable Explosive Atmospheres and Fire Hazards

All ECC field personnel will be responsible for observing and reporting fires and conditions that could lead to fires. During all on-site activities, the following practices will be used for fire prevention and protection:

- Smoking on-site will be prohibited in the CRZ and EZ, or other areas where smoking may create a fire hazard (dry fields etc);
- A smoking area will be established by the HSO when site operations begin;

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- Accumulations of combustible scrap and debris on-site will be promptly removed and properly disposed;
- Care will be taken with all equipment to reduce the possibility of sparks or open flames;
- Fire extinguishers (minimum 10-pound ABC) will be available at the EZ and SZ;
- A fire extinguisher will be available on any piece of heavy equipment;
- Fire extinguishers will be inspected monthly;
- Defective fire fighting equipment will be replaced immediately; and
- Fires or open flame devices will be prohibited, unless supervised by the PM and the HSO.

4.2.3 Open Excavation Hazards

Field personnel may be exposed to hazards associated with excavation activities. A primary hazard with excavation operations is contact with underground utilities including electrical, gas, water, and sewer. To mitigate these hazards, the HSO will take the following actions:

- Verify the exact location of each authorized excavation with on-site officials prior to breaking ground;
- Make every attempt to determine the presence or absence of any underground utilities in the region by contacting Underground Service Alert, New York One Call, and/or local utility services;
- Document utility clearance by completing a Field Safety Checklist (Attachment B);
- Hand dig to verify location of utilities where contact with utilities is questionable; and
- Arrange for the deactivation of utilities whenever possible and appropriate for the circumstances.

The open, excavated area could result in falls. To mitigate the hazard of falling, the following safety actions will be taken:

- Clearly mark and secure excavated areas with barricades and caution tapes to prevent unauthorized and/or accidental entry into work areas; and
- Direct necessary foot and vehicle traffic around the excavation work areas, with the routes clearly marked.

Another hazard is the potential for the soil to cave-in. The soil that will be encountered in the excavations is presumably Type C soils as defined by 29 CFR 1926.650 Subpart P- Excavations. Therefore, ECC will take adequate steps to protect employees by sloping and/or benching

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excavations greater than 5 feet deep. In excavations of contaminated materials, sidewalls will be sloped 1 vertical to 1.5 horizontal (1V: 1.5H) and mechanically compacted at the end of the day to minimize erosion.

Daily inspections will be made of the Site, including the excavations and adjacent areas, by the HSO or his representative to check for unstable areas and other hazardous conditions. The inspection will be conducted prior to the commencement of work and throughout the shift, as needed. Inspections will be made after each rainstorm or other occurrence, which could increase the hazards associated with the Site.

4.2.4 Overhead Electrical Hazards

Overhead power lines that are within the area of operation present significant hazard due to heavy equipment and high clearance vehicles. Energy lines will be deenergized, relocated, or guarded in some other manner to protect employees working near those utilities.

Unqualified employees and mechanical equipment must stay at least 10 feet (3.05 meters) away from overhead power lines. If the voltage is more than 50,000 volts, the clearance will be increased by 4 inches (10 centimeters) for each additional 10,000 volts. When mechanical equipment is being operated near over-head lines, employees standing on the ground may not contact the equipment unless it is located so that the required clearance cannot be violated even at the maximum reach of the equipment.

ECC will employ a licensed electrician to perform any work on power lines or electrically charged equipment.

4.2.5 Confined Space Entry

Entry into a confined space will not be allowed when oxygen readings are less than 19.5% or greater than 23.5% or if the Lower Explosive Limit (LEL) reading is greater than 10%, unless these conditions are adequately addressed in the confined space entry program. In addition, action levels for toxic atmospheres will be determined. Attachment C provides the confined space program (SOP HS-017) that will be strictly followed during any confined space entry, and the Confined Space Entry Permit (Attachment C) used to document confined space work.

4.2.6 Improper Lifting

To control improper lifting by employees, the following procedures will be implemented:

- Correct lifting procedures (straight back, bend legs, lift with legs, and keep object as close to the body as possible); and
- "Buddy system" or use of handcart to avoid back strain.

Attachment D presents a detailed discussion on proper lifting techniques.

4.2.7 Heat Related Stress

If Site activities are conducted in the summer, there is a potential for personnel to suffer from heat related stress. Additionally, the use of PPE increases the potential even further. Heat stress is a significant potential hazard associated with the use of protective equipment in hot weather environments.

The following precautionary measures can be taken to ensure Site personnel do not become susceptible to heat stress:

- Have workers drink fluid (preferably water or diluted drinks) before beginning work. Urge workers to drink a cup or two at each scheduled break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight;
- Encourage workers to maintain an optimal level of physical fitness. Where indicated, acclimatize workers to Site work conditions;
- Provide cooling devices to aid natural body heat exchange during prolonged work or severe heat exposure; and
- Train workers to recognize, identify, and treat heat stress.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important, because once someone suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat injuries. To avoid heat stress, the following steps should be taken:

- Work schedules should be adjusted;
- Shelter (air-conditioned, if possible) or shaded areas should be provided to protect personnel during rest periods;
- Workers' body fluids should be maintained at normal levels to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, the worker should be encouraged to drink more;
- Water temperature should be maintained at 50 degrees Fahrenheit (°F) to 60°F (10 degrees Celsius (°C) to 15.6°C); and
- Disposable cups that hold about 16 ounces should be provided.

Working with PPE in hot weather environments may produce circumstances that will require restricted work schedules in order to protect employees. During summer months, a Wet Bulb Globe Temperature (WBGT) Index will be used to establish a work/rest cycle during hot climate. The WBGT Index will not be used in reference to impermeable clothing because evaporative

cooling (wet bulb temperature) will be limited. Physiological monitoring (sweat rate, sweat evaporation rate or skin temperature, heart rate, core temperature) will be used instead.

If the measured WBGT exceeds 86°F (76°F when workers are wearing semi-permeable clothing), the work/rest cycle presented in Table 4-1 will serve as a guideline. The use of the work/rest cycle, training on signs and symptoms of heat related illness, and prompt action if systems are observed should prevent heat stress from occurring.

Table 4-1
Permissible Heat Exposure Threshold Limit Values (Values are given in °F WBGT)

Work/Rest Regimen	Light Work Load	Moderate Work Load	Heavy Work Load
Continuous Work	86	80	77
75% Work - 25% Rest each hour	87	82	78
50% Work - 50% Rest each hour	89	85	82
25% Work - 75% Rest each hour	90	88	86

- When workers are wearing semi-impermeable clothing, subtract 10°F from the WBGT value in the above table; and
- Rest indicates minimal physical activity. Rest should be accomplished in the shade. Any activity requiring only minimal physical activity can be performed during rest periods.

The following sections briefly discuss the heat related stress and emergency response actions.

4.2.7.1 Heat Cramps

Heat cramps are brought about by long exposure to heat. As an individual sweats, water and salts are lost by the body resulting in painful muscle cramps. The signs and symptoms of heat cramps are as follows:

- Severe muscle cramps, usually in the legs and abdomen;
- Exhaustion, often to the point of collapse; and
- Dizziness or periods of faintness.

First aid treatment consists of providing shade, rest, and fluid replacement. Normally, the individual should recover within 30 minutes. If the individual does not recover within 30 minutes, the individual should be transported to a hospital for medical attention.

4.2.7.2 Heat Exhaustion

Heat exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. The circulatory system of the individual begins to fail as blood collects near the skin in an effort to relieve the body of excess heat. The signs and symptoms of heat exhaustion are as follows:

- Rapid and shallow breathing;
- Weak pulse;
- Cold and clammy skin with heavy perspiration;
- Pale skin;
- Fatigue and weakness;
- Dizziness;
- Elevated body temperature; and
- Fainting and Nausea.

First aid treatment consists of cooling the victim, elevating the feet and replacing fluids. If the individual has not recovered within 30 minutes, the individual should be transported to a hospital for medical attention.

4.2.7.3 Heat Stroke

Heat stroke occurs when an individual is exposed to excessive heat and stops sweating. This condition is classified as a medical emergency, requiring immediate cooling of the patient and transport to a hospital. The signs and symptoms of heat stroke are as follows:

- Dry hot red skin;
- Body temperature approaching or above 105°F;
- Large (dilated) pupils; and
- Loss of consciousness - the individual will go into a coma.

First aid treatment consists of cooling and transporting the patient to a hospital immediately.

4.2.8 Cold Stress

If Site work is to be conducted during the winter, cold stress is a concern to the safety and health of personnel. Potential hazards in cold environments include the physical hazards of slips, trips and falls on icy surfaces, as well as hypothermia and frostbite; physical conditions that gradually occur over time of exposure and often result in personnel employing poor judgment and taking high-risk short cuts. The serious medical consequences of hypothermia and frostbite are discussed below. Because disposable protective clothing such as Tyvek® does not “breathe,”

perspiration does not evaporate and the suits can become wet. Wet clothes combined with cold temperatures can lead to hypothermia. If the air temperature is less than 40°F and an employee perspires, the employee must change to dry clothes. The following are five degrees of cold stress in increasing order of severity:

- Incipient frostbite is a mild form of cold stress characterized by sudden blanching or whitening of the skin;
- Chilblain is an inflammation of the hands and feet caused by exposure to cold moisture. It is characterized by a recurrent localized itching, swelling, and painful inflammation of the fingers, toes, or ears. Such a sequence produces severe spasms, accompanied by pain;
- Second-degree frostbite is manifested by skin with a white, waxy appearance that is firm to the touch. Individuals with this condition are generally not aware of its seriousness, because the underlying nerves are frozen and unable to transmit signals to warm the body. Immediate first aid and medical treatment are required;
- Third-degree frostbite will appear as blue, blotchy skin. The tissue is cold, pale, and solid. Immediate medical attention is required; and
- Hypothermia develops when body temperature falls below a critical level. In extreme cases, cardiac failure and death may occur. Immediate medical attention is warranted when the following symptoms are observed:
 - Involuntary shivering
 - Irrational behavior
 - Slurred speech
 - Sluggishness

Progressive clinical symptoms of hypothermia are presented below in Table 4-2.

Table 4-2
Symptoms of Hypothermia

Body Core Temperature (°F)	Symptoms
98.6	Normal rectal temperature
96.8	Metabolic rate increases
95.0	Maximum shivering
93.2	Victim conscious and responsive
91.4	Severe hypothermia
89.6-87.8	Consciousness clouded, blood pressure difficult to obtain, pupils dilated but react to light, shivering ceases
86.0-84.2	Progressive loss of consciousness, muscular rigidity increases, pulse and blood pressure difficult to get, respiratory rate decreases
78.8	Victim seldom conscious
64.4	Lowest temperature in which a hypothermia victim has recovered

To care for any frostbite, handle the area gently. Never rub an affected area because rubbing causes further damage to soft tissues. Warm the affected area gently by soaking the affected part in water no warmer than 105°F. Keep the frostbitten part in the water until it looks red and feels warm. Loosely bandage the affected area with a dry, sterile dressing. If fingers or toes are frostbitten, place cotton or gauze between them. Do not break any blisters caused by frostbite. Obtain professional medical attention as soon as possible.

To treat hypothermia, start by caring for any life-threatening problems and call for emergency medical assistance. Remove any wet clothing and dry the victim. Warm the body gradually by wrapping the victim in blankets or putting on dry clothing and moving him or her to a warm place. If available, apply heat pads or other heat sources to the body, but be sure to keep a barrier such as a blanket, towel, or clothing between the heat source and the victim to avoid burning the victim. If the victim is alert, give him or her warm liquids to drink. Do not warm the victim too quickly, such as by immersing the victim in warm water, because rapid re-warming can cause dangerous heart problems. In cases of severe hypothermia, the victim may be unconscious. Should the victim stop breathing, give rescue breathing when necessary and be prepared to administer Cardiopulmonary Resuscitation (CPR).

In order to minimize the risk of the hazards of working in cold environments, workers will be trained and periodically reinforced to recognize physiologic responses of the body to cold stress. In addition, the use of insulated work clothing, warm shelters, and work/warm regimens may be used to minimize the potential hazards of cold stress. Wearing of three layers of clothing is also recommended. The primary purpose of the inner layer, or underwear worn closest to the skin, is to “wick” perspiration away from the skin. The most commonly used material is polypropylene. **Avoid** cotton found in some cheap winter underclothing. When cotton gets damp, it can cause more body heat loss than if no underwear is worn at all. The first layer should be relatively thin and light and have an open or zippered neck to prevent the build-up of too much heat when working. Where OSHA safety requirements preclude synthetic fabric, use silk. The middle-insulating layer holds in the body’s warmth using trapped still air. Wool, one of the better insulating materials, holds air among its many twisted and resilient fibers. Though somewhat heavy, it is a logical choice if OSHA does not allow synthetic fibers. Down, or feathers, traps air in the spaces between the feathers. Down is **not suitable** because it can lose up to 98 percent of its insulating properties when wet. Synthetic insulating materials like Qualofill, Holofill, and Duofill trap air between the fibers and in the core of each fiber, which are manufactured with long hollow tubes of air built into each fiber strand. The outer layer protects the other two layers from wind and rain while letting perspiration escape. Gore Tex and similar treated fabrics will keep external moisture out in all but the wettest of conditions. When selecting outer layer garments it is important that they are ventilated to prevent heat and moisture build ups when doing heavy labor. The jacket, and ideally the pants, should have external zippers, so they can be opened to provide critical ventilation. Several materials will work, including the rather expensive Nomex. However, don’t select Nomex 1 materials, as they will shrink badly around the wearer when exposed to high heat. Also, special attention will be paid to equipment warm-up time and freeze protection for vessels, piping, equipment, tools, and keeping walking/working surfaces clear and ice-free (by shoveling, salting, and sanding).

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4.2.9 Noise

Noise can cause sudden traumatic temporary hearing loss, long term sensory-neural hearing loss that is irreversible, disruption of communication, and masking of warning devices and alarms. During the performance of activities at the Site, equipment such as drill rigs, backhoes, and compressors may be used that may require the use of ear protection due to elevated noise levels. The SHSM or designee will monitor high noise levels when equipment or machinery is being used on Site. If noise levels reach or exceed 85 decibels on the Decibel A-weighted Scale (dB(A)) (any noise/sound preventing normal vocal discussion between two individuals at arms length), hearing protection will be required and the area should be posted "Hearing Protection Required". All project personnel will wear hearing protection devices when required or where signs are posted requiring their use. The hearing protection provided must be able to lower noise levels below 85 dB(A) threshold when worn. Compliance standards for occupational noise exposure are found in 29 CFR 1910.95.

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Minimum Noise Reduction Ratings (NRR):

Hearing protectors issued to or used by personnel must have the following minimum NRR:

- Ear Plugs = 29 dB
- Muffs = 27 dB

Noise surveys must be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys must be conducted under supervision of the Health and Safety Program Representative.

Sound level meters and audio dosimeters used to determine employee exposure to noise sources must be Type II (accurate to within +/- 2dB), operated in "slow" response, on the "A" scale, and be calibrated to factory guidelines (including periodic factory recalibration).

Eliminate noise sources to the extent possible. Examples of controls that must be considered follow:

- Addition or replacement of mufflers on motorized equipment;
- Addition of mufflers to air exhausts on pneumatic equipment;
- Following equipment maintenance procedures to lubricate dry bearings;
- Isolation of loud equipment such as compressors and generators from employee work areas; and
- Replacement of older noisy equipment with newer and quieter models.

Verify that employees who are required to wear hearing protection have a clearance to work in high noise environments from the Regional Medical Surveillance Administrator.

4.2.10 Slips, Trips, and Falls and Fall Protection

Slips, trips, and falls are common work-place accidents that have a potential to cause serious injury. In order to minimize the risk of slips and trips, ECC personnel will keep all work areas as uncluttered as possible. Good housekeeping practices are the best way to minimize slips and trips. Spilled material will be cleaned up immediately. The following are additional measures that will be implemented to minimize the risks of these hazards to project personnel:

- Running anywhere on the Site is prohibited except in emergencies;
- Pay careful attention to walking surfaces, especially when they are wet or icy;
- Clear water, ice or spills as quickly as possible off walking surfaces or in high traffic areas;
- Do not take short cuts over fences or walls;

- Do not jump over excavations;
- Any platform area higher than 4 ft will have standard guard railings and toe-boards; and
- If possible, use non-slip surfaces when constructing platforms.

ECC will ensure fall protection/prevention systems are provided at all locations where fall hazards of 6 feet (2 meters) or greater exist. Fall protection will be provided according to the requirements of 29 CFR 1926 Subpart M.

4.2.11 Use of Hand and Power Tools

Throughout the project, a variety of tools will be employed and will present hazard to those employees operating them. The tools include shovels, chainsaws, drills, etc.

OSHA regulations regarding hand tools will be observed in addition to the guidelines provided below:

- Each tool should be used only to perform tasks for which it was originally designed;
- Damaged tools should be repaired before use or discarded;
- Safety goggles or glasses should be worn when using a hammer or chisel;
- Nearby co-workers and by-standers should be required to wear safety goggles or glasses also, or move away; and
- Tools should be kept cleaned and stored in an orderly manner when not in use.

4.3 Chemical and Radiological Hazards

The following sections describe Site radiological and chemical hazards identified relative to the known Site contaminants.

4.3.1 Site Radiological Hazards

The primary radiological hazards at the site are Ra-226 and Th-232. Analytical results indicate the presence of Ra-226 ranging in concentration from Background (~1 pCi/g) to 250 pCi/g. Th-232 was detected at concentrations from Background (~1 pCi/g) to 220 pCi/g. The U.S. Environmental Protection Agency (EPA) has also identified potentially significant levels of radon gas in the Dickson Warehouse. Precautions to minimize exposure from radon gas will be followed.

Radium is a naturally occurring radioactive element that exists in several isotopes, which are formed from the decay of uranium and thorium. Ra-226, a decay product of Uranium 238, is an alpha and gamma emitter and has the longest half-life of the radium isotopes. The EPA has classified Ra-226 as a known carcinogen. Radium may bio-accumulate in plants and animals.

Radon, a decay product of radium, is a colorless, odorless, radioactive gas that can infiltrate basements and water systems resulting in significant exposure through inhalation.

4.3.1.1 XRF Instrument Operation

An additional radiological hazard is presented during use of the XRF instrument. To mitigate that hazard, training for the safe operation of the instrument and radiation training will be completed by the analyst prior to analysis. Radiation safety for each specific instrument can be found in the operator's manual. The protective shielding will never be removed. Fail-safe x-ray warning lights will be illuminated whenever an x-ray tube is energized. A log of the times and operating conditions will be kept whenever the x-ray tube is energized. X-ray tubes also present electric shock hazards from the high voltage power supply.

4.3.2 Non Radioactive Toxic Metals Exposure

While working on-site, employees may be exposed to arsenic and lead during the excavation and loading of contaminated soil. The most likely exposure to these heavy metals is through inhalation with contaminated soils. Exposure through ingestion or absorption is less likely. Dust suppression, personal air monitoring, PPE, and personal industrial hygiene cleanliness practices will be used to minimize exposure to metal contaminants.

4.3.3 Respirable Dusts and Particulates

Contact with respirable dusts and particulates contaminated with As, Pb, Ra-226, Th-232, and progeny deposits are anticipated. Dust control monitoring and measures such as wetting, vacuuming, or decontaminating dusty areas prior to the removal work coupled with the proper use of respiratory protective equipment will be imperative to control and minimize exposure.

When air sampling or contamination survey results indicate a potential for exposure to airborne contaminants Level C PPE, with a full-face air purifying respirator will be worn by all workers to eliminate the possibility of inhalation. Downgrading to Level D in certain areas will be based upon the continuation of similar activities after obtaining acceptable air monitoring results (e.g., no positive readings above background from the area air sampler) and the concurrence of the HSO, PHP, and the on-site regulatory officials.

Action levels for upgrade are based upon 10 CFR 20.1003 and the DACs listed in Appendix B, 10 CFR 20 (Table 3-1). An action level of 0.6 percent of the ALI or 12-DAC hours in a week is required by 10 CFR 20.1003. In order to establish an operational limit, 20% of the DAC will be identified as an action level for upgrade. Critical level calculations will be incorporated. The risk of level C is always a consideration, however, if 20% of the DAC or the 12 DAC-hour limit is exceeded, there is no alternative to the selection of respiratory protection.

4.4 Biological Hazards

The following potential Site biological hazards have been identified for the project.

4.4.1 Ticks

Working in tall grass, especially in or at the edge of wooded areas, increases the potential for ticks to affect workers. Ticks are carriers of many different diseases, including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever, and Lyme disease. Ticks attach to their host's skin and intravenously feed on the host's blood, thus creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellents help prevent tick bites. Periodically during the workday, employees will inspect themselves for the presence of ticks.

If a tick is discovered, the following procedure should be used to remove it:

- Do not try to detach a tick with bare fingers; bacteria from a crushed tick may be able to penetrate even unbroken skin;
- Used on-site tick removal kits;
- Grip the tick as close to the skin as possible and gently pull it straight away from the skin until it releases its hold;
- Do not twist the tick while pulling and do not squeeze its bloated body. That may actually inject bacteria into the skin;
- Thoroughly wash hands and the bite area with soap and water. Then apply an antiseptic to the bite area;
- Save the tick in a small container with the date, the body location of the bite, and where it is thought the tick came from; and
- Notify the SHSO of any tick bites as soon as possible.

Recently, Lyme disease has been the most prevalent type of disease transmitted by ticks in the United States.

4.4.2 Chiggers

Chiggers may be a problem when working in grassy areas at project locations. The application of insect repellants can help prevent bites from these insects. If a chigger bite is experienced, the bite should be washed with soap and water and then a commercial preparation of medication for chigger bites should be applied. The clothes that were worn when the bite(s) occurred should be placed in a plastic bag for temporary storage until they can be laundered.

4.4.3 Rodents and Other Mammals

Rodents and other mammals, such as dogs, cats, raccoons, foxes, and bats, have the potential to be infected with the virus that causes rabies. An animal infected with the disease may act strangely (e.g., not afraid of humans, out at the wrong time of day or night), drool, or appear partially paralyzed. If someone is bitten by an animal, treat the wound first, especially if the bleeding is serious, then get the person immediate medical attention. **If left untreated, rabies is a fatal disease.** Do not attempt to kill or capture the animal, as future injuries could result. Call the local animal control authorities, and provide them with a description of the animal and the location of the incident.

The potential for exposure to microbiological hazards such as viruses, bacteria, and molds carried by rodents also exists. Personnel will avoid disturbing small rodent nesting areas and will keep eating and work areas free of food supplies that would attract mice. The Hanta virus can be carried in the liquid and solid excrement of field mice. Exposure occurs through inhalation of dusts associated with mice droppings. Personnel who enter buildings that show evidence of rodent droppings will not stir up the dust without the use of Level C PPE. Buildings that show evidence of rodent droppings will be disinfected prior to performing work in them.

4.4.4 Poisonous Plants

Poison ivy, poison oak, and poison sumac are identified by three or five leaves radiating from a stem. Poison ivy is in the form of a vine while oak and sumac are bush-like. All of these plants can produce a delayed allergic reaction. The plant tissues have an oleoresin that is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur 24 to 48 hours after exposure and result in rashes that itch and blister. Should exposure to any of these plants occur, wash the affected area with a mild soap and water within one-half hour, but do not scrub the area. The best preventive measure for poisonous plants is recognition and avoidance.

4.4.5 Flying Insects

Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while Site activities occur. Bee stings can cause severe, even fatal, reactions in individuals who are allergic to them. Personnel who are allergic to bee stings must notify their supervisor and the HSO prior to working on Site. A mosquito bite can transmit West Nile Virus. West Nile virus activity peaks in August and September. Mosquito bites can be effectively prevented by the use of insect repellants. ECC will use those repellents recommended by the CDC and the EPA specifically, those with DEET, pircardin or oil of lemon eucalyptus. Treatment for insect bites and bee stings can be effected by the use of commercially prepared ointments.